CLAIMS

What is claimed is:

1. A method for increasing the sensitivity of a luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces luminescence that is not dependent on the presence of an analyte by at least about 10 fold, and that reduces luminescence that is dependent on the presence of an analyte by less than about 7 fold.

2. A method for increasing the sensitivity of a luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces luminescence generated by luminogenic molecules not bound to an enzyme by at least about 10 fold, and that reduces the luminescence generated by luminogenic molecules bound to an enzyme by less than about 7 fold.

3. A method for increasing the sensitivity of a luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces autoluminescence by at least about 10 fold, and that reduces luminescence that is dependent on the presence of an analyte by less than about 7 fold.

4. The method of any one of claims 1-3 wherein the luminescent assay employs a luciferase, aequorin, or obelin enzyme.

5. The method of any one of claims 1-3 wherein the luminescent assay employs firefly luciferase.

6. The method of any one of claims 1-3 wherein the luminescent assay employs *Renilla* luciferase.

7. The method of any one of claims 1-3 wherein the luminescent assay employs *Cypridina* luciferase

8. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of at least 0.1 μM.

9. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of at least 0.1 mM.

10. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 0.1μM to about 500 mM.

11. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 100μM to about 100 mM.

12. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 10 mM to about 100 mM.

13. The method of any one of claims 1-3 wherein the assay is performed in the presence of whole cells.

14. The method of any one of claims 1-3 wherein the assay is carried out in a solvent comprising at least about 10% water by weight.

15. The method of any one of claims 1-3 wherein the assay is caried out in a solvent comprising at least about 25% water by weight.

16. The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 5 fold.

17. The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme is reduced by less than about 5 fold.

18. The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 5 fold.

19. The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 2 fold, remains the same, or is increased.

20. The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme is reduced by less than about 2 fold, remains the same, or is increased.

21. The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 2 fold, remains the same, or is increased.

22. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing luminescence that is not dependent on the presence of an analyte by at least about 10 fold, and for reducing luminescence that is dependent on the presence of an analyte by less than about 7 fold.

23. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing luminescence generated by luminogenic molecules not bound to an enzyme by at least about 10 fold, and for reducing luminescence generated by luminogenic molecules bound to an enzyme by less than about 7 fold.

24. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing autoluminescence by at least about 10 fold, and for reducing luminescence that is dependent on the presence of an analyte by less than about 7 fold.

25. The kit of any one of claims 22-24 wherein the enzyme substrate and the compound are each contained in a separate container

26. The kit of any one of claims 22-24 wherein the enzyme substrate and the compound are contained in a single container.

27. The kit of any one of claims 22-24 further comprising a buffer solution suitable for use in a luminescent assay.

28. The kit of claim 27 wherein the enzyme substrate and the buffer solution are contained in a single container.

29. The kit of claim 27 wherein the compound and the buffer solution are contained in a single container.

30. The kit of any one of claims 22-24 further comprising a substrate for a second luminescent enzyme.

31. The kit of any one of claims 22-24 further comprising a quenching agent for a luminescent enzyme reaction.

32. The kit of any one of claims 22-24 wherein the substrate is a substrate for firefly luciferase or *Renilla* luciferase.

33. The kit of any one of claims 22-24 further comprising ATP.

34. The kit of any one of claims 22-24 that comprises both a luminogenic substrate of a luminescent enzyme, and a luminogenic enzyme.